Spatial Analysis Lab Fall 2020 Semester Review

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Apéritif

Appetizer

Soup

Salad

Main Course

Dessert

Mignardise

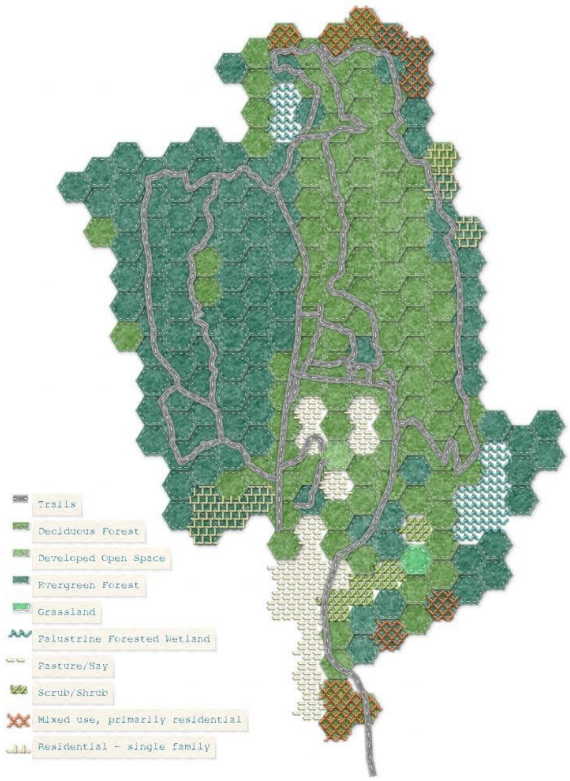
HORS D'OEUVRE

Here it is, while we mingle in these cavernous (i.e. seemingly endless) Zoom rooms, the "weather" talk: The fall was a (now) precedented remote semester, and the broader world accentuated our collective desire for placemaking and the ambivalence towards the technologies that mark us on a map. As the nation frenzied over election counting in the foreground, we took account of the less discernible "counting" – the 2020 Census and the redrawing of political power for the next decade. The Mappiest Day of the Year (GIS Day) came and went, quietly ("you're muted"), modestly (without a cake in *any* map projection) – yet a nourishing taste of the generative work that can be accomplished with a community of practice. On the rare occasions that we found ourselves cautiously coming together from the mandated apartness, we found ourselves *doing* spatial science and cherished the Rules of Fieldwork: 1. Don't get separated from your lunch, and 2. Better with friends and snacks. The day-to-day interactions with students, faculty, and staff were nominally remote, and actually enhanced. We learned along the way, and documented the what and how the best we could.

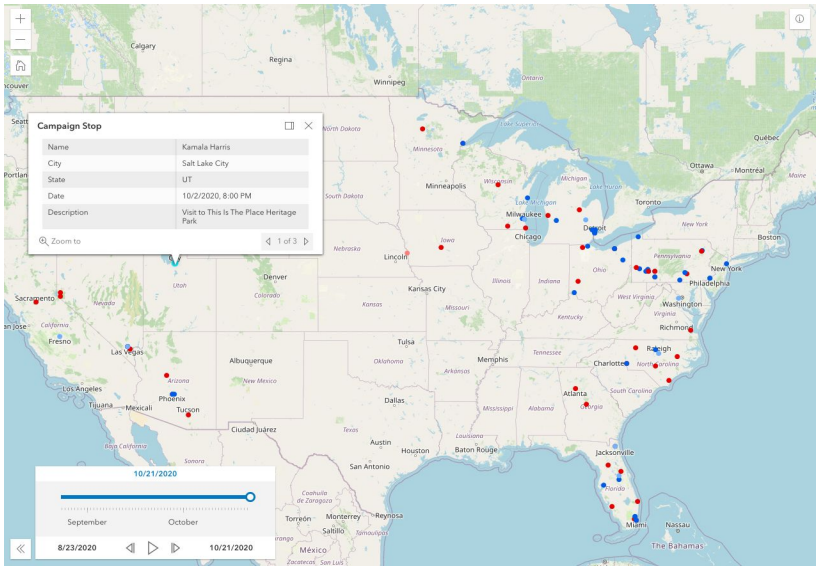
But what do I know? I'm just a cucumber tea sandwich.

APÉRITIF

#30DayMapChallenge: Day 18 Land Use:

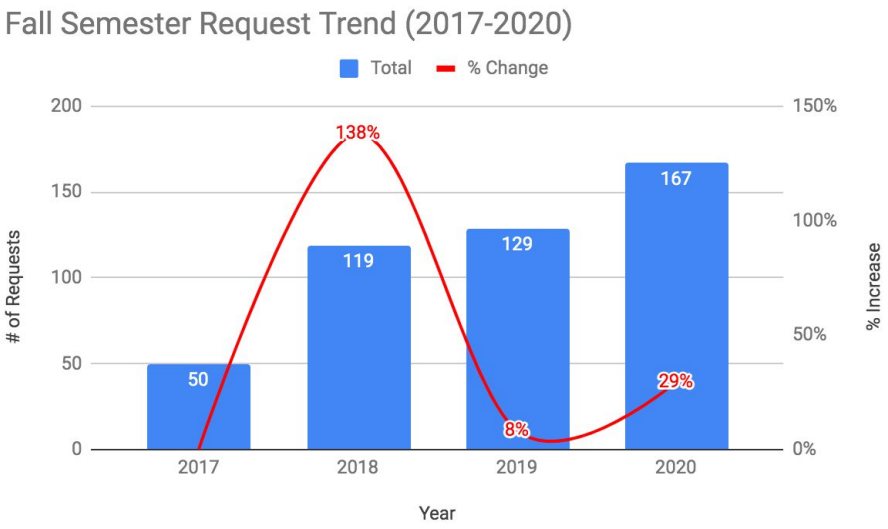


October Mystery Map:

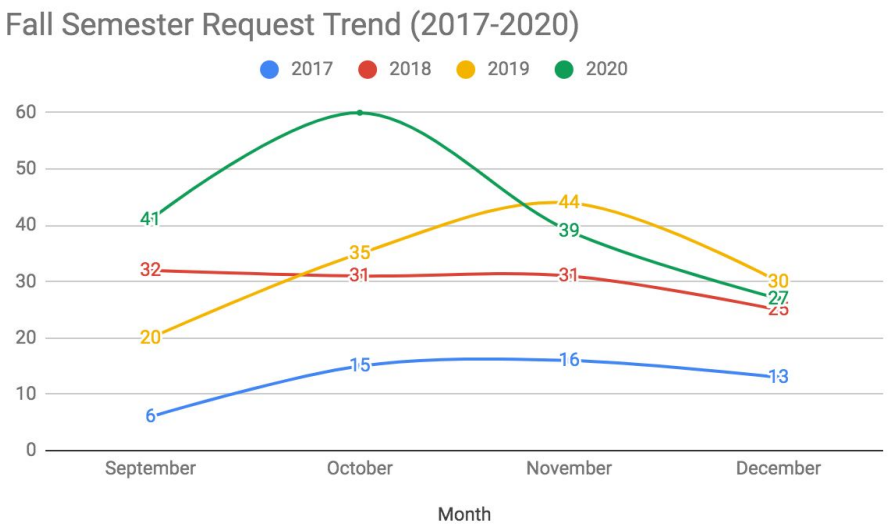


APPETIZER

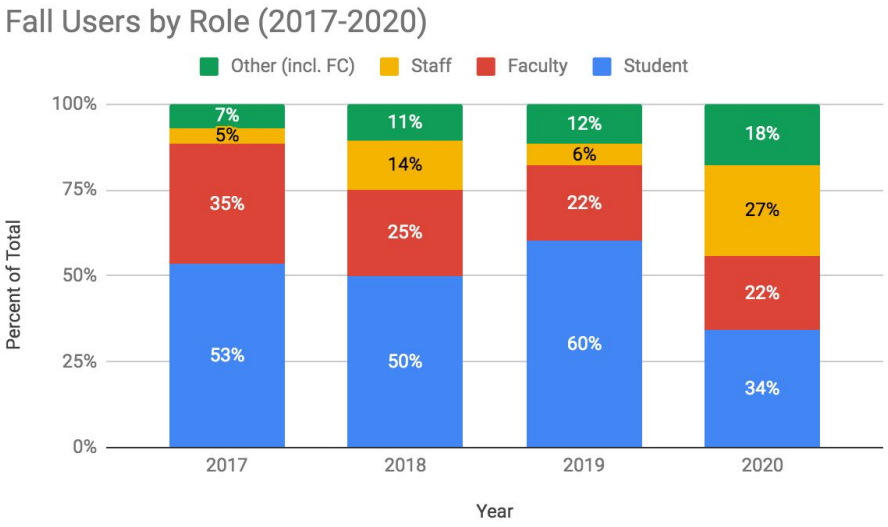
The semester in byte-size: Requests steadily trend upwards, with a 29% increase from 2019.



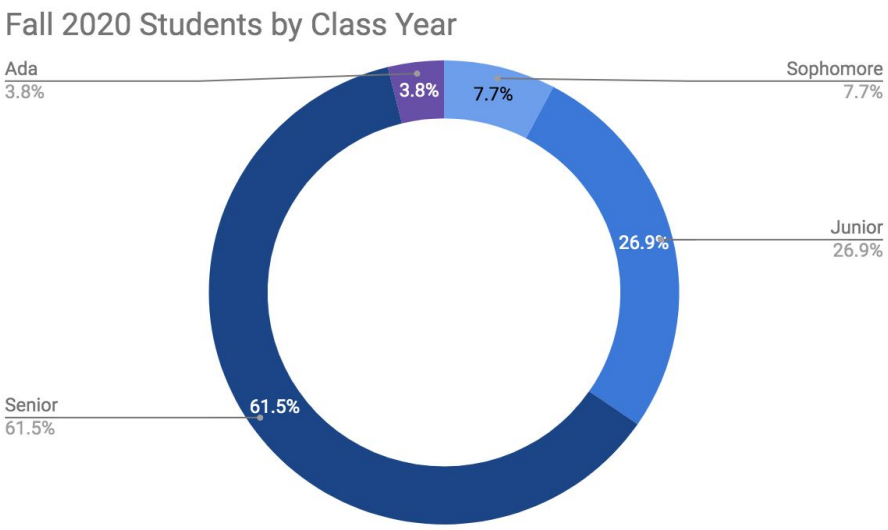
Requests in finer temporal resolution show the semester tempo. The crescendo of the semester – typically mid-semester assignments and pivot to final projects – was earlier due to a shortened semester.



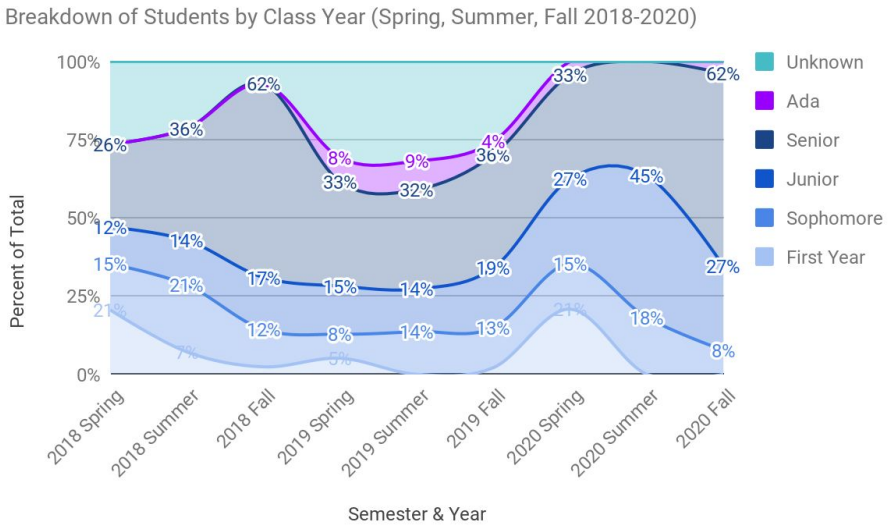
There were 79 distinct users: 27 students (undergrad, grad, Ada), 17 faculty, 21 staff, and 14 others (including Five College affiliates.) The significant increase in demand from staff attributed to the amplified need for public mapping endeavors (for example, the two collaborations with the Art Museum on a virtual tour of art on campus, and a virtual Ancient World Gallery exhibit), drone surveys/imagery (for example, pre-/post-sediment redistribution of Paradise Pond, aerial imagery for the Landscape Master Plan and the Botanic Garden), and quarantine GIS learning.



The composition of students remained consistent – juniors and seniors were prominent due to the combination of a. generally familiar with actively seeking help from academic resources, and b. upper-level classes for this fall (such as EGR422D Engineering Design Clinic, SDS390 Ecological Forecasting, ENV201/202 Researching Environmental Problems.)



Interesting to observe that first-years and sophomores surface in the spring. Deviled egg if I know why – groundhogs?



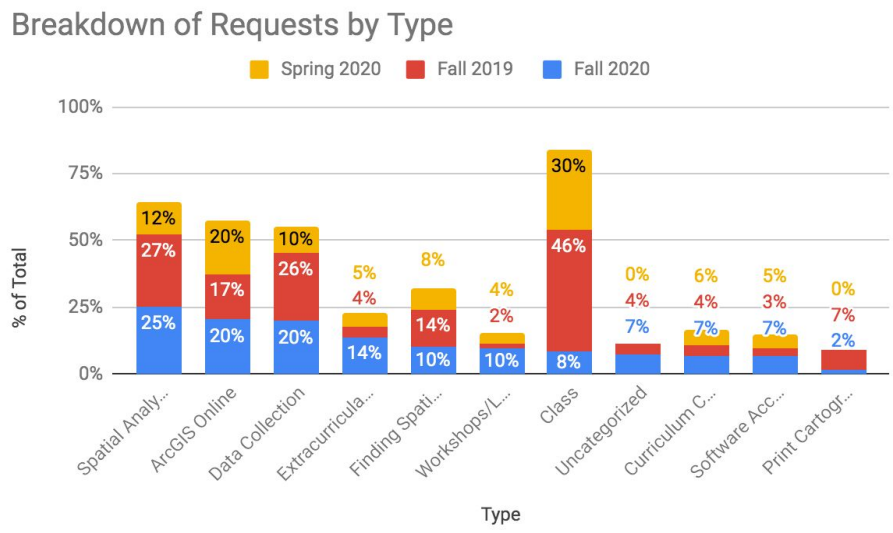
Requests classified qualitatively and quantitatively showed that spatial analysis is the holy guacamole, with web mapping and data collection in a close wrap. Here is our classification scheme for reference:

Type	Subtype
Spatial Analysis	ArcGIS Online[1]
	ArcMap/ArcPro
ArcGIS Online[2]	Webmap
	StoryMaps
	Logistics
Data Collection	Drone video/image
	Mapping/Survey
	GPS
Extracurriculars[2]	
Finding Spatial Data	
Workshops/Learning Resources	
Class	Projects
	Lab exercise
	Lecture
Uncategorized	
Curriculum Consult	
Software Access/Installation	
Print Cartography	

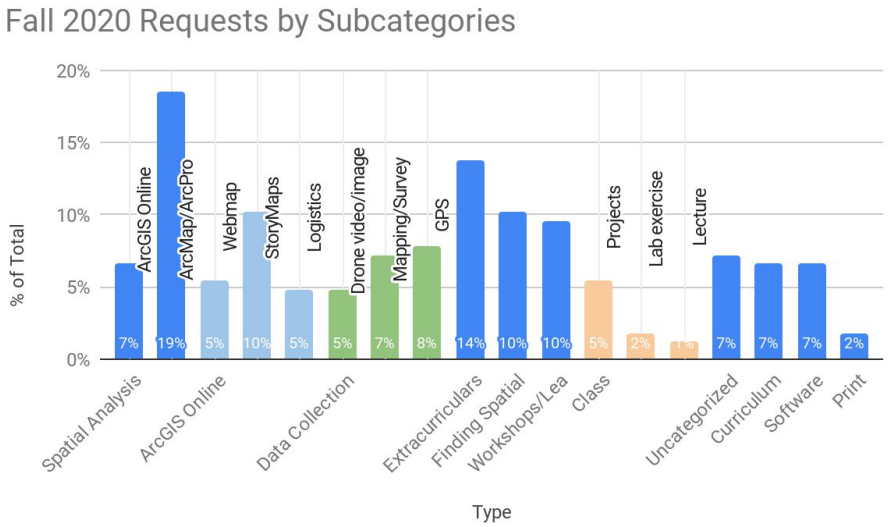
Compared to the previous school year (fall 2019 - spring 2020), we noted:

- A dramatic reduction in *class support*; since we had similar involvement with classes (5) for spring 2020 and fall, the difference is due to our last post-bac Emma Harnisch '19 ending her term in the summer. The post-bac has an embedded role in classes and near-peer tutoring. We worked with 11 classes in fall 2019.
- A relatively less dramatic increase in *workshops/learning resources*, impacted by going remote
- *Extracurriculars* can refer to activities such as writing a recommendation letter for a former lab assistant, sharing a GIS internship/job, or other administrative tchotchkes.
- *Data collection* discrepancy between spring and fall: weather

[1] *Spatial Analysis - ArcGIS Online* applies when using analysis tools in ArcGIS Online; whereas *ArcGIS Online - Webmap* refers to visualizing/displaying data.
[2] e.g. writing a recommendation letter for a former lab assistant, sharing a GIS internship/job, or other administrative items



A higher resolution breakdown:



ArcGIS Online, with its complementary suite of data collection, storytelling, and interactive apps, has had comparable use to its desktop counterpart. Field data collection apps such as Collector, Field Maps integrate well with our newest survey-grade GPS units (EOS Arrow's), and Survey123 prove to be a simple yet effective solution for crowdsourcing. Then there's the "gateway drug"[3] that is StoryMaps; there were 36 StoryMaps created this fall. GEO/ENV150 wasn't offered this fall (where students practice creating StoryMaps each module), so these StoryMaps were uncompulsory creations. Here are public ones to share:

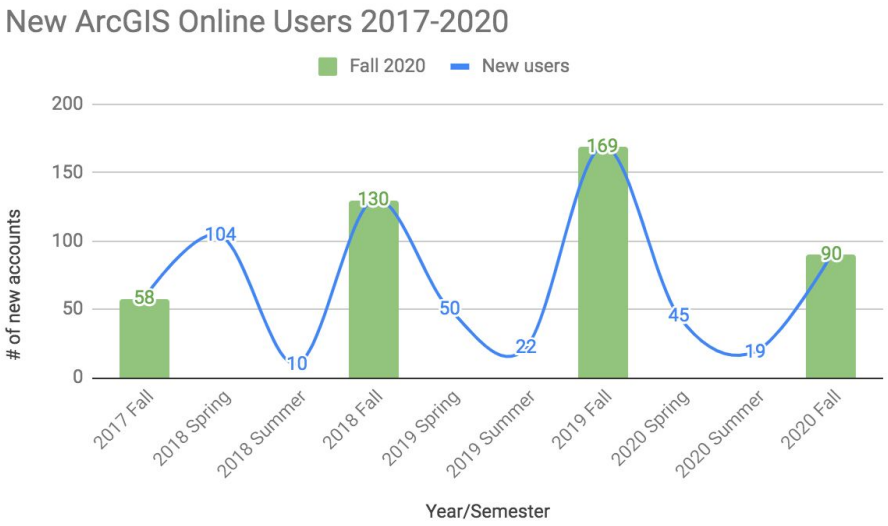
- The Mill River Greenway in Industrial Florence by Espy Thomson '21 & Emma Krasky '21 - In a special studies with Reid Bertone-Johnson (LSS) & Gaby Immerman (BG), Espy and Emma sought out StoryMaps as their medium to visualize the provided spatial data and existing maps. With no prior GIS experience, they learned by visiting office hours and doing relevant training

[3] Cowen, D.J. (2019) GIS Support in Academic Libraries survey. Unpublished raw data.

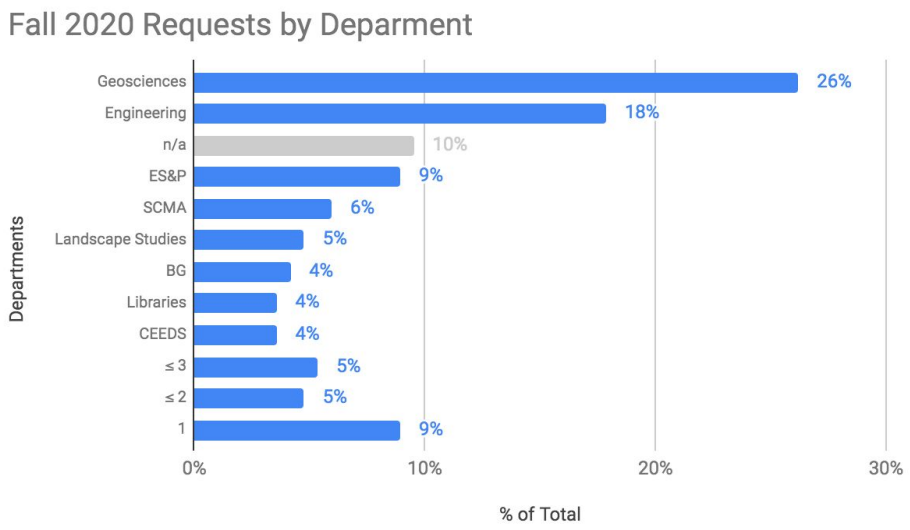
resources – the result is the manifestation of persistence and excellent use of interactive features and theme customization.

- California Air Quality by Isa West ‘22 - This was a final project assignment for ENV311 Interpreting & Communicating Environmental Problems; a thoughtful discussion of human-enviro interactions, focusing on disparate air quality burden, and a creative way of using the Swipe feature to highlight air quality and major interstates.
- The Geology of Northampton’s Downtown Buildings & Structures by Rana Gahwagy ‘22 - A collaboration between Historic Northampton and Geosciences, a whirlwind of a tour through a geologist’s eye. Did you know the limestone steps to Edward’s Church contained fossils??

The 90 new users were a testament to ArcGIS Online’s compatibility to remote teaching/learning, and ubiquitous want for digital scholarship surrounding mapping.



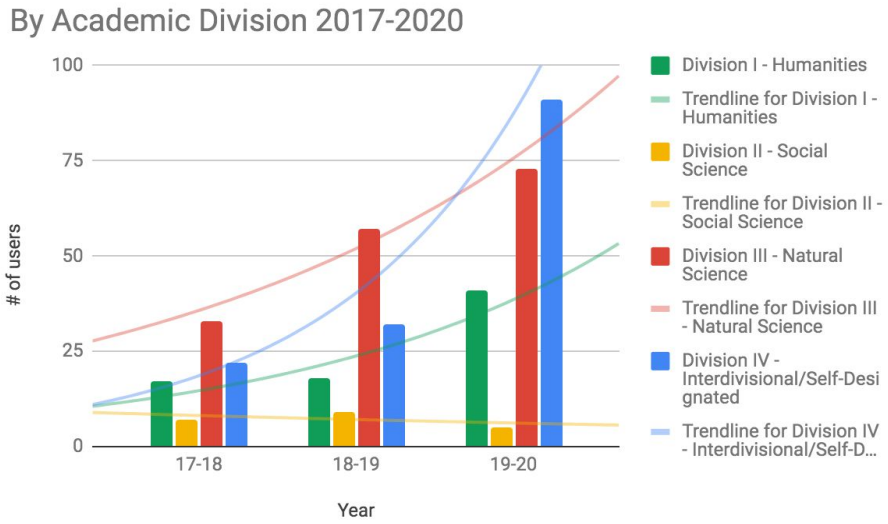
Departments in the Natural Sciences (Geosciences and Engineering) were prominent patrons, followed by Interdivisional programs (Environmental Science & Policy and Landscape Studies). This pattern for the fall substantiates the larger current of departmental/divisional usage of the SAL – overall increase in Div III - Natural Sciences, Div I - Humanities, and steeper increase in Div IV - Interdivisional, as well as continued and extended collaboration across campus. Newer campus collaborators include Facilities, the Jandon Center, College/Alumnae Relations.



Detailed list of departments for occurrences ≤ 3:

≤ 3	Computer Science Art: History Facilities
≤ 2	Urban Geography Study of Women & Gender College Relations Art: Architecture & Urbanism
1	Theatre Statistical & Data Sciences Jewish Studies Other Jandon Center ITS Government Geography Ecological Design & Sustainability Dance Chemistry CATS Biology Anthropology Alumnae Relations & Development

Theatre, Jewish Studies, and Urban/Geography (self-designated) were new departments – the first two were Where I Am in the Amplifier Project and a map for publication (in progress by our current lab assistant Hannah Dillahunt ‘21.)



SOUP

Workshop series to address an almost coup. Plus, engineers up in arms.

This fall, we hosted a five-part workshop series themed around elections. The workshops were designed to be standalone (i.e. attending a previous part is not a prerequisite) and each emphasized a facet of GIS: spatial thinking, data collection, data visualization, finding and assessing spatial data, spatial analysis, and storytelling with maps. Titles and descriptions below (tutorials & recordings posted):

Title	Description
What's in a Map?	Introduces GIS (Geographic Information Systems) and exercises spatial thinking through critiquing the abundance of election maps available – what are the ingredients and motivations that go into making such a map, and how can we be conscientious map consumers? We will explore interactive maps on U.S. elections, and what election maps look like globally. Professor Sara Newland will talk about the role of maps in political science research.
Polling a Polling Station	This workshop guides you through designing geolocated surveys to capture and share crowdsourced map data using Survey123. We can use this data collection technique to investigate questions such as: How and where is your community voting? What are the conditions of polling stations? Where are mailboxes or ballot drop boxes being removed?
Redistricting & Gerrymandering (is it /g/erry or /j/erry?)	The term "gerrymandering" was named after the 9th governor of Massachusetts Elbridge Gerry, for redrawing the South Essex senate district in favor of his party – in the shape of a salamander. In this workshop we discuss the implications of representation, and learn to classify and symbolize election results in a web map using ArcGIS Online. Kelsey Kauffman (DePauw University) will talk about local and particularly, prison redistricting.
Electing Data	Learn how to find and assess spatial data, and perform analysis in ArcGIS Online

	to examine the variables that can contribute to understanding issues like: voter turnout, changing district demographics, campaigning, and others. UMass Amherst GIS Librarian Dr. Becky Seifried will share how to approach and research a spatial inquiry.
Not Fake News – Crafting a Spatial Narrative with StoryMaps	In this workshop, we will use StoryMaps and web apps as a digital storytelling tool to present the spatial narrative of an election map. We will practice communicating data to a broader audience, using maps to weave together the present political fabric. UMass Amherst GIS Librarian Dr. Becky Seifried will join us in a conversation on digital narratives.

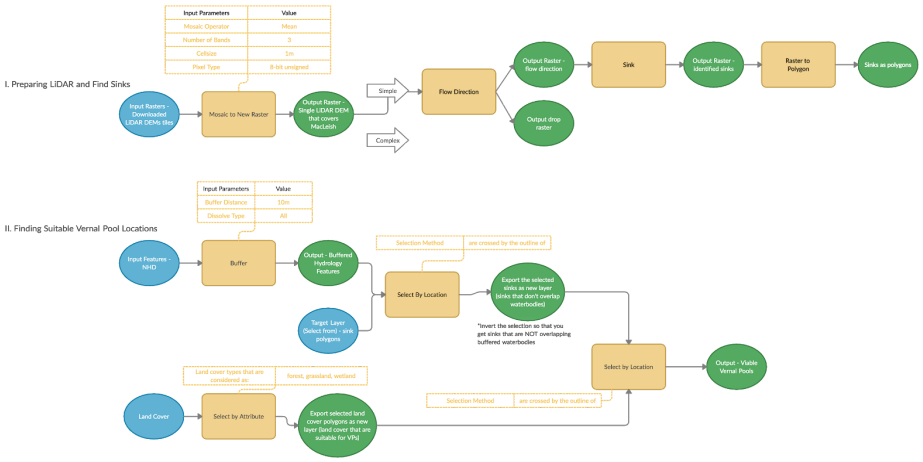
The series had 34 participants overall and a 32% attendance rate. *Part 1: What's in a Map?* had the highest number of participants and attendance rate (16 and 73%, respectively), largely due to the charms of Sara Newland. The virtual format allowed us the opportunity to have practitioners in various fields demonstrate how they use GIS in their work. For example, Kelsey Kauffman needs spatial statistics to determine if local districts are redistricted properly based on compactness, continguousness, and population deviation of <10% between the largest and smallest districts. Sara Newland used the example of the "nine-dash line" and the inclusion/exclusion of Taiwan from maps of China to illuminate how maps influence geopolitical narratives. Becky Seifried explained the process of searching for and evaluating 2016 precinct-level election data and combining them with demographic data.

We offered an additional workshop *ArcGIS Overview* in late October, to orient an array of students, faculty, and community partners (18 in attendance) to the ArcGIS ecosystem. The content spanned from distinguishing desktop and web GIS, creating and managing common spatial data formats, and choosing analysis tools. Karyn Nelson (GIS Coordinator - Northampton Department of Public Works) described the hour-long workshop as "a semester course of content."

SALAD

A real mix along a spatial spectrum.

STRIDE & AEMES project advised by Amy Rhodes (GEO) to adopt LiDAR methodologies to detect potential vernal pools at MacLeish Field Station. The two student researchers learned GIS progressively through the semester, then applied their newly acquired spatial knowledge to tackle the workflow for a suitability analysis using LiDAR and various hydrological criteria. Amy concurrently advised a special studies project that pertained to analyzing spatial patterns of geochemical samples in study sites around the Valley.



The Paradise Pond Drawdown project flowed on – with drone surveys conducted prior and after sediment redistribution to create high-resolution orthomosaics to calculate volumetric change. The process involved setting out Ground Control Points measured with RTK GPS, then flying pre-planned missions; the post-processing is done in the photogrammetry software Pix4D. Round foods for every mood were graciously provided by Gary Hartwell (Facilities) and shared with Bob Newton (GEO.)

The Museum of Art had two projects percolating – a virtual tour of the art installation around campus, and a digital exhibit of the Ancient World Gallery. Our lab assistant Hannah Dillahunt '21 applied her craft in data wrangling and story-mapping to create a prototype awaiting going live in the spring. The gallery project selected an art history research fellow who is researching and preparing the materials for each item featured in the exhibit.

John Brady (GEO), who works by his motto "the one who sees the most rocks wins," surged on with his interactive digital geology textbook using D3.js.

MAIN COURSE

ENV201/202 Researching Environmental Problems……**MP**
Spatial thinking/GIS lecture preceded by readings on redlining and doing environmental justice research with maps[4] and followed by discussions on suspicious GA daily COVID-19 case maps, history of cartography lecture complemented by case study exercise addressing data, methodology, implications, rounded with a lab exercise on COVID Health Disparities and Air Quality Burdens. Final semester projects include Volkswagen settlement fund distribution in CA and TX, and adopted policies of towns within the MA Sierra Club.

EGR422D Engineering Design Clinic……..….**MP**
Two current projects: "Complete Streets Design for South Street in Northampton, MA" (with Northampton Department of Public Works) and "Feasibility Design of the Northampton State Hospital Shared Use Path" (with Northampton Office of Planning and Sustainability, Mill River Greenway

[4] Moore et al. (2019) "Undisciplining environmental justice research with visual storytelling" *Geoforum* 102: 267-277. https://doi.org/10.1016/j.geoforum.2017.03.003

Initiative.) The first project entailed field data collection using high-accuracy GPS units to identify points of interest, and preliminary spatial analysis to establish the base maps to then incorporate into their design considerations. The latter emphasized accessibility by evaluating the terrain using LiDAR.

SDS390 Ecological Forecasting……...**MP**
Albert Kim designed an activity using the "perfect plasticity approximation" method, which uses three ground measurements: location, species, and tree size (diameter at the breast height). The lesson was conducted in Area D near Paradise Pond, where tree census data are available. The SAL surveyed the "true" overstory with a drone to provide a comparison to the ground-based crown estimation. Read Jon's more accurate and detailed reflection here.

SDS192 Intro to Data Science……...……..**MP**
Live streaming of MacLeish Field Station using the neighbor's WiFi. Students used spatial data from MacLeish with R packages for spatial analysis (i.e. sf) and visualized the results in Leaflet. Exercise examples include proposing a new bike trail for MacLeish based on criterias like loop length and slope.

MUX119 Museums in Society……...…..**MP**
Jon spoke to the class about the COVID-19 Experience Map along with fellow panelists Elizabeth Shapre (Historic Northampton - COVID-19 Stories) and Nanci Young (Smith College Archivist - COVID-19 Chronicles). The prompt was to demonstrate the work of rapid collecting and archiving, or, in our case, crowdsourcing.

DESSERT

Something sweet to cleanse the palate:

- Revamped website
- New journal subscription to Journal of Map & Geography Libraries: Advances in Geospatial Information, Collections, & Archives. However, Terminator Salvation (2009) and Terminator Genisys (2015) are still unavailable.
- Tracy had new peer-reviewed musings – a GeoTIFF Primer and maps in Yanlong Guo's (ART) forthcoming article in *Asian Perspectives: The Journal of Archaeology for Asia and the Pacific*
- Tangy – Jon and Tracy served on fruitful search committees, respectively, for ES&P's human geographer and a Educational Media Producer

MIGNARDISE

> "After today's class, I feel I better understand how raw data is then analyzed to be put into an ineffective or effective map that can tell a story about the environment. I also learned that all the choices going into the map such as color and context are equally as important as the data being presented." - *Anonymous Student* re: ENV201/202 lecture

> “I wish this was how I had been introduced to GIS!” - *Hannah Asofsky '21* re: ENV201/202 lab exercise

> “I really liked the activity we did in groups. I enjoyed the one about bears because I didn't know that they had the technology to calculate their mass without having to drug them and manually weigh them.” - *Anonymous Student* re: ENV201/202 jamboard exercise

> “Slick new design! I love it.” - *Albert Kim* SDS re: new SAL website